



Cleanup Levels for Missouri (CALM)

Hazardous Waste Program fact sheet

6/2003

What Is CALM?

CALM is a guidance document that outlines a process for determining risk-based soil and groundwater cleanup levels at sites contaminated with hazardous substances. Cleanup levels are designed to be protective of human health and the environment. They are based on land use and the varied human exposures those land uses imply. CALM is used in Missouri's Voluntary Cleanup Program (VCP). This fact sheet introduces some key features of CALM.

What's So Great About CALM?

Three main characteristics set CALM apart from its predecessor document, *How Clean is Clean? Uniform Cleanup Standards For Contaminated Sites in Missouri*, which was a conservative, "one-size-fits-all" approach to setting cleanup levels. First, CALM cleanup levels are based on several additional exposure pathways. Second, because differences in land use often result in differing exposure factors, CALM allows for cleanup levels for different land uses based on actual exposures and risks relevant to each site. Third, a three-tier approach allows greater flexibility in determining site cleanup levels, from using a simple lookup table in Tier 1 to performing highly site-specific risk assessments in Tier 3.

Site Assessment and Characterization (SAC)

Prior to setting cleanup levels, all sites must be adequately assessed and any contamination discovered must be fully characterized. Some guidance on SAC is provided in CALM. Contact the department for more information on SAC.

Site Classification

To determine appropriate cleanup levels, sites are classified according to land use. A qualitative exposure assessment is conducted to classify sites into land use "scenarios" (either A, B or C).

Scenario A is "unrestricted use;" a cleanup to scenario A levels allows any use, including residential. Scenarios B and C allow less stringent cleanup levels but restrict the property use to commercial and industrial, respectively.

Tier 1

In Tier 1, site contaminant levels are compared to pre-calculated values for the appropriate land use scenario. The look up table values were calculated by Missouri Department of Natural Resources and the Department of Health using simple models and conservative

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assumptions. The user may choose either to clean up contamination exceeding the Tier 1 levels or, if warranted, further evaluate the site under one or both of the other tiers. If site contaminant levels do not exceed the Tier 1 look up table values, no remediation is necessary and the user may apply for a certification of completion. All evaluation and remediation activities are conducted under Department of Natural Resources oversight.

Tier 2

In Tier 2, the same models and formulas are used as in Tier 1, but some of the assumptions and variables may be changed using site-specific data. The user may choose to remediate the contaminants exceeding Tier 2 levels or, with the department's approval, further evaluate the site under Tier 3. If site contaminant levels do not exceed the Tier 2 values, no remediation is necessary, and the user may apply for a certification of completion. All evaluation and remediation activities are conducted under Department of Natural Resources oversight.

Tier 3

In Tier 3, the models and formulas used in Tiers 1 and 2 may be replaced with alternate modeling techniques to calculate site-specific cleanup levels. Tier 3 is intended for sites where:

- Site geology or hydrogeology is complex;
- Remediation to Tier 2 levels is not technically feasible;
- Quantitative ecological risk assessment is warranted; or
- Tier 1 and 2 models do not adequately represent site conditions.

Department approval is required prior to advancing to Tier 3.

Ecological Risk Assessment

All sites evaluated under CALM are assessed for potential threats to ecological receptors. A qualitative ecological exposure assessment is conducted to investigate the presence of receptors and pathways. If both receptors and pathways are found to be present, a quantitative ecological risk assessment may be needed.

Engineering Controls

An engineering control (EC) is a physical barrier that serves to limit exposure to or control migration of contaminants. These include fences, impermeable caps, groundwater barriers and others. Properly implemented, ECs reduce exposure by eliminating the exposure route between the contaminant and the receptor. Under CALM, ECs may, under certain circumstances, be used to allow contaminants to safely remain on site after closure. Use of ECs under a CALM closure requires the use of institutional controls to ensure that the engineering control remains intact and effective.

Institutional Controls

Institutional controls are legal mechanisms that limit or impose conditions on land use. Under the CALM guidance, they are used to ensure that future land uses are consistent with the assumptions made during the CALM evaluation and to notify future property owners of the

site's environmental condition. Cleanups to Scenario B or C (non-residential) levels under any tier require the use of institutional controls. Three types of controls are described in CALM:

1. Restrictive Covenant
2. Title Notification
3. Monitoring Contract

More information on these control mechanisms is available from the Hazardous Waste Program.

Where CALM Is Used

CALM is used for sites enrolled in Missouri's Voluntary Cleanup Program. The department is evaluating the feasibility of adapting CALM for use in other programs.

More Information

To obtain a copy of CALM, contact the department's Outreach and Assistance Office at 1-800-361-4827 or (573) 526-6627. A nominal fee is charged to cover printing and shipping costs. The CALM document may be downloaded from a link on the VCP Web site at no cost at www.dnr.mo.gov/alpd/hwp/hwpvcvp.htm. Be sure to check with the department for CALM updates, as periodic modifications and additions are expected. For questions about CALM or to find out how it could be used at your site, call the Voluntary Cleanup Section at (573) 526-8913.

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Related Fact Sheets

- Voluntary Cleanup Program (pub2035)
- VCP Frequently Asked Questions (pub2036)